

REMARKS

In the August 23, 2006 Office Action, claims 11-16 were rejected. Applicant respectfully declines to amend the claims at this time. Reconsideration of the application is respectfully requested in view of the following remarks.

Claims 11-16 stand rejected under 35 U.S.C. §102(e) as being anticipated by Kakizawa, USPN 6,580,556 (“Kakizawa”). Applicant respectfully traverses this rejection. Claim 11 is the only independent claim pending in the application, and therefore the following remarks about claim 11 also apply to dependent claims 12-16.

The method recited in claim 11 relates to the generation of a stereoscopic image of a scene in a manner that prevents frame violations in the viewed stereoscopic image. In the context of claim 11, “frame violations” have the meaning explained in Applicant’s specification. For example, paragraph [0004] of the application states that:

One problem commonly associated with stereoscopic images, however, involves difficulty in framing the various objects within in the confines of the two-dimensional representation. So-called “frame violations” typically result when objects appearing in front of the viewing surface (“the frame”) are clipped off by the edge of the display frame, thereby giving the illusion that closer objects are blocked by a surface that appears to be behind the closer object; this is contrary to the normal experience of interposition, where closer objects block the view of farther objects. In the case of mid-air refueling, for example, the refueling boom may appear in front of the stereo window (formed by the edge of the display, typically a panel-mounted flat panel display), thereby creating the potential for an unnatural appearance when a portion of the boom appears to be obscured by the display edge “behind” the boom. The visual paradox created by this occlusion of the stereoscopic frame potentially contradicts the binocular disparity of the stereoscopic image in the viewer’s mind, thereby disturbing the viewer’s accurate perception of three-dimensional position in space.

In connection with the description of one non-limiting embodiment, Applicant explains how such frame violations may be addressed (at paragraph [0014] of the application):

Such displays may be readily fitted with apertures, protrusions or other physical elements that obscure edge or other appropriate portions of a

miniaturized display to create a “mid-window” that effectively reduces or eliminates frame violations by blocking the portions of the display where frame violations may otherwise occur, and by presenting the viewer with the impression of looking out a traditional viewing window.

Notably, “frame violations” in the context of Applicant’s claims relates to the perimeter or outer frame of the stereoscopic image itself, which is akin to a frame surrounding a physical window for the user. Importantly, frame violations in the context of Applicant’s claims do not relate to the capturing or processing of individual video frames utilized for the stereoscopic image, where the word “frame” takes on a completely different meaning in connection with video processing, movie production, and cinematography.

In connection with one non-limiting embodiment, Applicant describes how frame violations can be prevented by using a display convergence point that is distinct from the observer’s focus point (see paragraph [0023] of the application). Here, the display convergence point corresponds to the intersection of the centerlines for the left and right viewing modules; reference number 310 represents the display convergence point for the exemplary system depicted in FIG. 3. Notably, as mentioned in paragraph [0023] of the application, the focus point and the display convergence point are distinct to limit the effects of frame violations; the focus distance and the display convergence point are selected “to prevent objects of interest from moving in “front” of the mid-window.”

As further described in connection with one non-limiting embodiment, Applicant explains how frame violations can be prevented by using a certain camera configuration when capturing the images to be displayed (see paragraph [0014] of the application). Here, a plurality of cameras are oriented such that they have a convergence point that corresponds to the intersection of the centerlines projecting from each of the cameras. Notably, frame violations can be reduced if the camera convergence point is located closer to the cameras than the objects of interest in the captured scene.

The Office Action maintains the previous rejection and again contends that Kakizawa discloses each and every limitation of claim 11. Applicant respectfully disagrees with the manner in which the Office Action characterizes Kakizawa and again submits that Kakizawa does not anticipate claim 11.

Kakizawa generally discloses a system for viewing a stereoscopic image pair through a plate having a single aperture, as plainly shown in FIG. 1. Kakizawa's FIG. 2 depicts a videoconferencing version of the basic system, where each participant views his respective stereoscopic image pair through a respective plate having a single aperture. In this videoconferencing version, a stereoscopic image pair of each participant is captured by two cameras (reference numbers 18a-18d) located on the participant's side of the viewing plate.

Contrary to the conclusion reached in the Office Action, Kakizawa does not teach or suggest the recited step of "obscuring at least a portion of the stereoscopic display from the observer with a mid-window to thereby prevent frame violations in the stereoscopic image." The Office Action quotes Kakizawa, cites to Kakizawa at FIG. 4 and Column 3, Lines 5-28, and correctly concludes that Kakizawa performs video frame processing. As explained above, however, such video frame processing is completely unrelated to the recited frame violations. The Office Action (at page 5) mentions that "Kakizawa does not disclose any frame violations resulting from this video frame processing, therefore "frame violations" must inherently be prevented by Kakizawa." With all due respect, this logic is flawed. Indeed, using the same logic, one would also conclude that Kakizawa inherently prevents video camera failures simply because Kakizawa does not mention camera failures, or that Kakizawa inherently prevents the cameras from taking unfocused images simply because Kakizawa does not mention unfocused images. These examples illustrate that the Office's inherency argument is not well founded.

Again, "frame" violations as recited in Applicant's claims and a video "frame" as disclosed by Kakizawa relate to different and distinct concepts and the Office's blending of the two concepts is misplaced. Consequently, in contrast to the conclusion reached in the Office Action, Kakizawa's flow chart (FIG. 4) and the description of how the Kakizawa system decompresses and sizes video frames does not teach the prevention of frame violations as recited in claim 11. Moreover, the description of how the Kakizawa system enables a participant to move his/her head without losing the ability to view the image of the other participant does not teach the prevention of frame violations as recited in claim 11.

For at least the above reasons, Kakizawa does not teach all of the limitations of independent claim 11. Therefore, Kakizawa does not anticipate claim 11 and Applicant requests the withdrawal of the §102 rejection of claim 11. For at least the same reasons,

Applicant requests the withdrawal of the §102 rejection of claims 12-16, which variously depend from claim 11.

Furthermore, Kakizawa does not teach the additional limitations recited in claim 13. In particular, claim 13 recites the step of “generating a focus point for the stereoscopic image that is distinct from the display convergence point.” As discussed above, Applicant’s FIG. 3 depicts the display convergence point 310 for an exemplary system. The Office Action at page 4 simply concludes that Kakizawa discloses this feature, citing Kakizawa at FIG. 1 and at Column 1, Line 45 to Column 2, Line 16. Applicant respectfully disagrees with this conclusion.

Claim 13 depends from claim 12, which in turn depends from independent claim 11. Claim 12 recites that the stereoscopic display includes left and right modules having a display convergence point, and claim 13 recites that the focus point for the stereoscopic image is distinct from the display convergence point. In contrast, Kakizawa does not teach or suggest a display system having a left module and a right module as recited in Applicant’s claims. Applicant notes that the user’s eyes (shown in Kakizawa’s FIG. 1 and FIG. 2) do not amount to left and right display system modules as recited by Applicant. Even assuming, for the sake of this argument, that the user’s eyes are equivalent to the recited left and right modules, Kakizawa contains no teaching or suggestion of the specific limitation recited in claim 13. Should the Office decide to maintain this rejection, Applicant kindly requests the Office to provide a detailed explanation of how Kakizawa teaches distinct display convergence and focus points.

For at least the additional reasons discussed above, claim 13 is allowable over Kakizawa.

Furthermore, Kakizawa does not teach the additional limitations recited in claim 16. Claim 16 depends from claim 15, which depends from claim 14, which depends from independent claim 11. Claim 14 recites that each video signal is produced by one of a plurality of cameras, and claim 15 recites that the cameras are configured with a convergence point for the video signals. In addition, claim 16 recites that “the convergence point is located closer to the plurality of cameras than a closest object appearing in the scene.” The Office Action at page 4 simply concludes that Kakizawa discloses this feature, citing Kakizawa at FIG. 1 and at Column 2, Lines 17-40. Applicant respectfully disagrees with this conclusion.

Kakizawa does not teach or suggest a system where the convergence point of a plurality of cameras is located closer to the cameras than a closest object appearing in the scene. As discussed above, this technique can be used to reduce the effect of frame violations. Kakizawa contains no teaching or suggestion of the specific limitation recited in claim 16. The cited excerpts of Kakizawa only disclose how the Kakizawa system uses two cameras to capture images of a user during a videoconference. Kakizawa is completely silent with respect to the convergence point of the cameras. Consequently, Kakizawa includes no teaching of the specific convergence point arrangement relative to the objects of interest, as recited in claim 16. Should the Office decide to maintain this rejection, Applicant kindly requests the Office to provide a detailed explanation of how Kakizawa teaches this aspect.

For at least the additional reasons discussed above, Kakizawa does not anticipate claim 16. Accordingly, claim 16 is allowable for these additional reasons.

In conclusion, for the reasons given above, all claims now presently in the application are believed allowable and such allowance is respectfully requested. Should the Examiner have any questions or wish to further discuss this application, Applicants request that the Examiner contact the undersigned attorney at (480) 385-5060.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

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By: /MARK M. TAKAHASHI/
Mark M. Takahashi
Reg. No. 38,631
(480) 385-5060